FRUGAL INNOVATION IN APPAREL

DESIGN FOR SUSTAINABILITY

A

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1.0 INTRODUCTION

Consumers purchase, wear and dispose of diverse garments throughout their entire lives. Although individual wardrobes can be large and many garments are added each year, a relatively small percentage of the wardrobe is regularly worn (Banim and Guy, 2003; Woodward, 2007, Dunne, Zhang, et.al. 2011).

The major movement of "fast fashion" has enabled overconsumption, and consequently the fashion industry's negative influences on the environment, the economy and society have increased. Consequently, fashion industries have been experiencing a rise in consumption. This excessive production causes increased "throwaway" fashion and disposal of textiles and garments, contributing to increased waste in landfills (Fraser, 2009).

Consequently, the idea of designing durable and long-lasting fashion textiles has been a recent trend in fashion industry. Cradle-to-Cradle approach (2002), is being implemented to reduce the impact on the environment. To reinforce this approach, the most effective way is to cut waste at the design stage. Designers are repeatedly declared as key agents of change in the transformation to a sustainable fashion industry (Fletcher, 2008, Gwilt, 2011, Niinimäki, 2011).

1.1 DESIGNS FOR SUSTAINABLITY (DfS)

To facilitate the shift towards sustainability, new concepts of design have emerged. Arising out of the ideas of "alternative design", "attitudinal design" and "design for need", eco-design became a key concept for those advocating for the ecologically responsible design of products (Rawsthorn, 2018). Design for sustainability is an approach that puts the well-being of people and the sustainability of the environment striving to global environmental crises, resource efficiency and social concerns.

Green Strategy's Anna Brismar has identified seven main forms of more sustainable fashion production and consumption, as seen in the Fig. no. 1.2. The figure thus shows seven forms of sustainable fashion to cater to different consumers' and producers' perspectives. All forms do not necessarily suit all people equally well because of different needs and preferences. Some individuals – usually younger – prefer to experiment with and renew their wardrobes often; using "Second hand & Vintage", "Repair, Redesign &Upcycle" and "Rent, Loan & Swap" would possibly be of most interest. For people who prefer

newly manufactured clothes without history and who has a consistent style, “On demand” and “High quality & Timeless design” are likely to be most attractive.

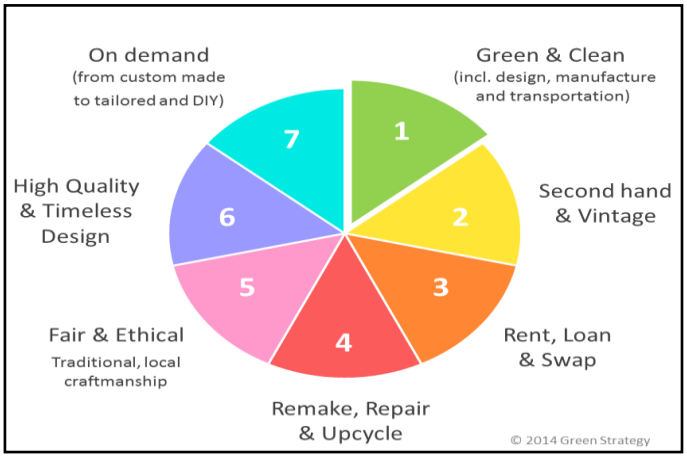

Fig-1.1 Seven forms of sustainable and Circular fashion Created by Dr. Anna Brismar, Green Strategy (Source: https://no.pinterest.com/pin/365143482261060069/)

Over time, in the fashion industry, many sustainable fashion innovations have been employed by designers to address the problems described above, the researcher attempts to propose frugal innovation in apparel design as an attempt to DfS method to decrease waste and make unique products in low cost.

1.2 FRUGAL INNOVATION

Frugal innovation is a strategy that focuses on the design and creation of simple but effective solutions to deliver affordable products, services or systems.

Frugal innovation rethinks the nature of innovation. “It is an ability to do more with less by creating more business and social value while minimizing the use of resources such as energy, capital and time”. Thus, Frugal Innovation or Jugaad Innovation is a design innovation process in which the needs and context of citizens in the developing world are put first to develop appropriate, adaptable, affordable, and accessible services and products for emerging markets (Radjou et al. 2013).

1.2.1 Principles of Jugaad/ Frugal Innovation

The Six Principles of Frugal Innovation (Radjou and Prabhu, 2014) are described in Fig. no. 1.4-

Additionally, according to Berger (2014) the acronym **F-R-U-G-A-L** can be used to explain its main features.

Fig- 1.2 Six principles of Frugal Innovation (Source: https://zlearningjourney.wordpress.com/tag/jugaad-innovation/)

1.3 ADAPTING FRUGAL INNOVATIONS IN APPAREL DESIGN

As shown in Fig no. 1.6, Charter and Chick (1997) proposed a "four step" model defining Degrees of Design Change: Re-pair, Re-fine, Re-design, and Re-think. Based on the above model, and other studies reviewed in the literature, the following frugal apparel design strategies are proposed by the researcher.

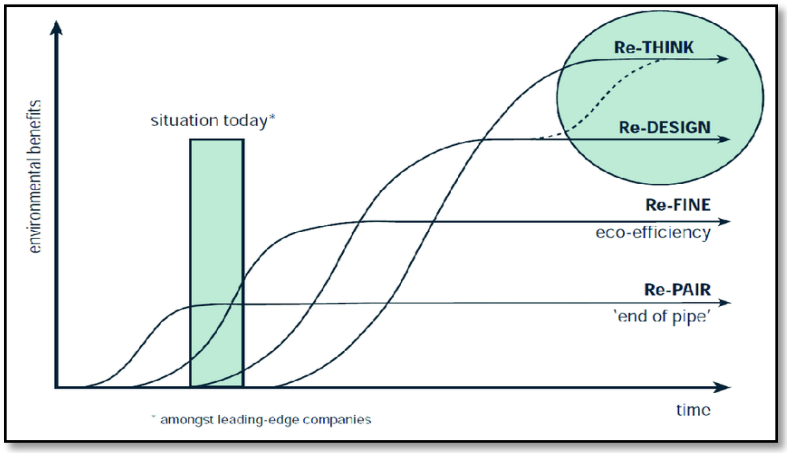

Fig – 1.3 "Four Step" Model (Source: Charter & Chick, 1997)

More designers need to work on the "Re-design" and "Re-think" levels to truly change the lifestyles away from destructive consumption. Consequently, the researcher proposes, the following design concepts which can lead to frugal innovation in apparel designing-

- Modular/ Transformable designs and Functional clothing

- Up cycling/Recycling designs
- Alternative designs

1.3.1 Modular/Transformable clothing, Functional clothing-

Modular design can be defined as a strategy to build systems or complex products from small individual subsystems/modules that work on as an integrated whole.

1.3.2 Up cycling/ Recycling-

Up-cycling is a process where waste or useless products are transformed into new materials or products of equal or better quality or a higher environmental value.

1.3.3 Low cost Alternative Product Design

Frugal innovation is finding a low-cost solution to any problem in an intelligent way. It is a new way of thinking constructively and differently about innovation and strategy. Jugaad is appropriated as design by designers. It is this appropriation of knowledge, by the use of terms like 'community-based design' and over 80% of the product cost is dictated by design.

The researcher in the present study thus attempts to recognize the local solutions and create innovative and low-cost minimalistic alternative designs and products in the field of apparel designs for societal benefit. Some of the examples of frugal innovation in the field of textiles include - Frugal Cotton Deshelling machine, Solar powered silk reeling machine to name a few.

1.6 NEED AND EMERGENCE OF THE STUDY

Fast fashion, marked by low prices and quickly-updated new items, and disposable fashion, purposely designed to have a short lifespan, have become central trends influencing this increase in waste; they encourage consumers toward overconsumption (Fletcher, 2008; Hawley, 2008; Hethornand Ulasewicz, 2008). Wasteful over-consumption causes an increase of resources in the fashion system's flow and has negative influences on the environment, economy, and society.

The role of the designer expands dramatically in light of current environmental concerns. In order to create products that truly meet the goal for sustainable consumption, they should be addressed at the design stage. As a result, many sustainable innovations also referred to as eco-innovations (Rennings,

2000) have been designed and successfully diffused in the markets. Frugal innovation is another type of innovation designed to facilitate the needs of individuals in the developing world or emerging markets (Basu et al., 2013).

Frugal design addresses environmental concerns by trying to decrease overall material use through innovative new materials and methods of fabrication (Le Bas, 2019).

In the present study, this idea of creating value-based apparel products through frugal strategies is proposed. The focus group kept in mind for imparting the skill of frugal designing, is the women force of our country since through frugal innovation solutions, they can fulfill their entrepreneurial pursuits.

Based on the following lines, the conceptual framework, objectives and the statement of study are proposed as follows-

1.7 CONCEPTUAL FRAMEWORK

As per the above objectives, the following conceptual framework is proposed-

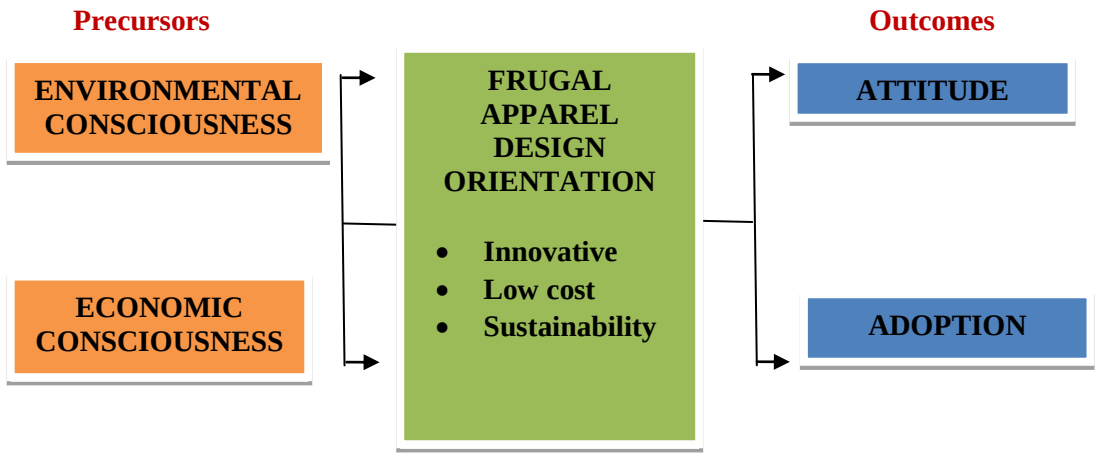

Fig-1.4 Conceptual Framework

1.8 OBJECTIVES

The objectives of this study are as follows:

1) To examine consumer's attitudes and intentions towards apparel disposal practices and factors influencing the sustainability in consumer consumption behaviour.

2) To investigate the precursors (environmental and economic consciousness) and outcomes (attitudes and intentions) of frugal apparel design orientation of consumers.
3) To introduce frugal apparel design strategies for sustainability by creating innovative apparel and allied products incorporating the frugal apparel design strategies.
4) To disseminate the information related to frugal apparel design strategies to the consumers and examine and evaluate their acceptability towards the developed products.
5) To introduce the frugal apparel design solutions to promote women entrepreneurship by imparting relevant skills and to identify potential marketing opportunities.

1.9 HYPOTHESES DEVELOPMENT

Based on the above framework, the following is hypothesized:

H1: The greater the environmental consciousness of the consumer, the higher will be his/her frugal apparel design orientation.

H2: The greater the economic consciousness of the consumer, the higher will be his/her frugal apparel design orientation.

H3: The greater the frugal apparel design orientation of the consumer, the higher will be his/her attitude towards sustainability (b) It's adoption intention.

H4: The greater the frugal apparel design orientation of the consumer, the higher will be his/her adoption intention.

H5: The frugal apparel design solutions would significantly encourage consumers to adopt frugal strategies for social sustainability.

1.10 STATEMENT OF THE PROBLEM

"FRUGAL INNOVATION IN APPAREL DESIGN FOR SUSTAINABILITY"

2.0 REVIEW OF LITERATURE

Review is the process of reading, analysing, evaluating, and summarizing scholarly materials about a specific topic. Some of variables of the study are elaborated below:

CONTENT													
		Frugal Innovation				**Sustainable and Frugal fashion**			**Forms of Sustainability inApparel design**				**Consumer disposable behaviour**
S.no	**Researcher**	**Consumer acceptance**	**Social sustainability**	**Minimal resources**	**Timeless style**	**Ethical fashion**	**Market strategies**	**Promote Sustainable consumption**	**Repair**	**Recycling/Up cycling**	**Reduce**	**Consumer awareness**	
1	Cherry Chong Wang		✓				✓	✓		✓			
2	Joanna Holmström							✓					
3	NajmulKadirKaikobad		✓										
4	Rakhshanda Khan	✓	✓										
5	JaideepPrabhu	✓		✓								✓	
6	Yasser Ahmad Bhatti						✓						
7	MokterHossain		✓					✓					
8	AnuragSrivastava.etal											✓	
9	Karin M. Ekström		✓					✓		✓			
10	Johanna Löfgren									✓			
11	S.Aishwariya									✓			
12	ArasinahKamis									✓			
13	BabitaDubey									✓			
14	AhmetÖzbek									✓	✓		
15	SooyoenShim.etal									✓			
16	Gail Jeanne Myers									✓		✓	
17	Julia Valle				✓							✓	
18	Minjie Gong					✓		✓					
19	PatchaUtiswannakul				✓								

20	Mohamed Mansour	✓			✓								
21	Mario Cadenas			✓									
22	Nidhiet.al		✓							✓			
23	Ceri X				✓	✓		✓		✓			
24	Fiona Harris		✓						✓	✓			✓
25	TimoWeyrauch	✓										✓	
26	Bingyue Wei			✓	✓			✓					
27	SerdarEgemen				✓								
28	Dombek-Keith	✓	✓										
29	Gwilt&Rissanen									✓			
30	Constanza Bianchi												✓
31	Cynthia v. Goudeau												✓
32	Bernardes J P												✓
33	Braungart& McDonough									✓			
34	Fletcher Kate									✓			
35	KirsiNiinimäki									✓			
36	Colledani M.	✓											
37	Jo Cramer							✓	✓				
38	BalajiParthasarathy			✓									
39	ParulSharda		✓										
40	RajnishTiwari			✓									
41	Rajeev Kumar					✓							
42	MaaritAakko						✓				✓		
43	Kehinde O. Oyelola							✓					

Table- 2.1 Review of literature

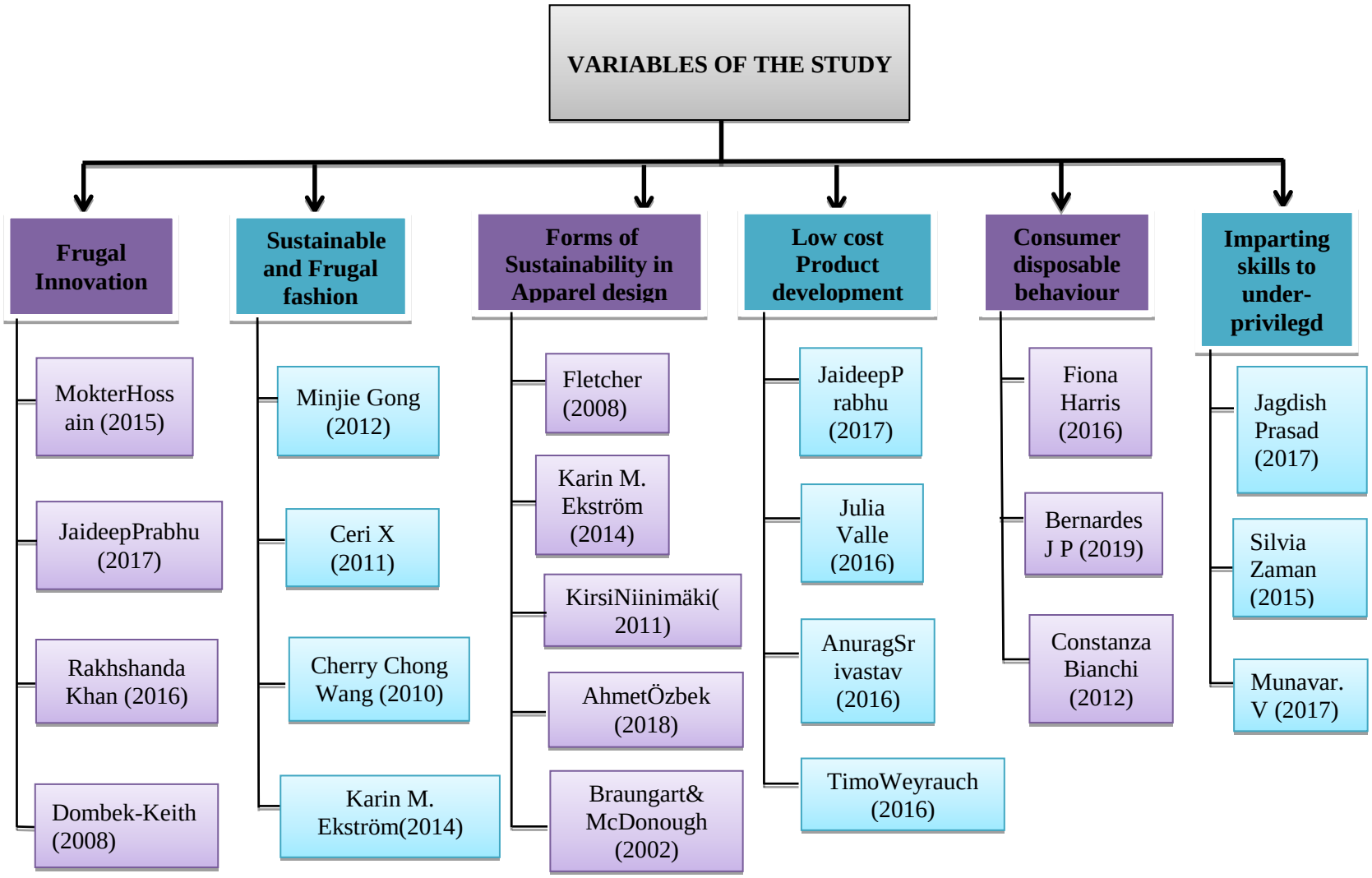

Fig-2.1 Variables of the study

3.0 RESEARCH METHODOLOGY

Methodology is a systematic and logical analysis to the research problem. It is a science of studying problem to carry out scientific solutions. The present study will be a **Mixed-methods research design.** The study will be accomplished under four phases which are elaborated and shown in the figure below:

3.1 EXPLORATORY PHASE

3.1.1 Explore the frugal innovation concepts

The initial part of research will consist of exploring the frugal innovation concepts. The researcher will review the literature and collate the case studies of social entrepreneurs contributing to sustainable apparel design process in India.

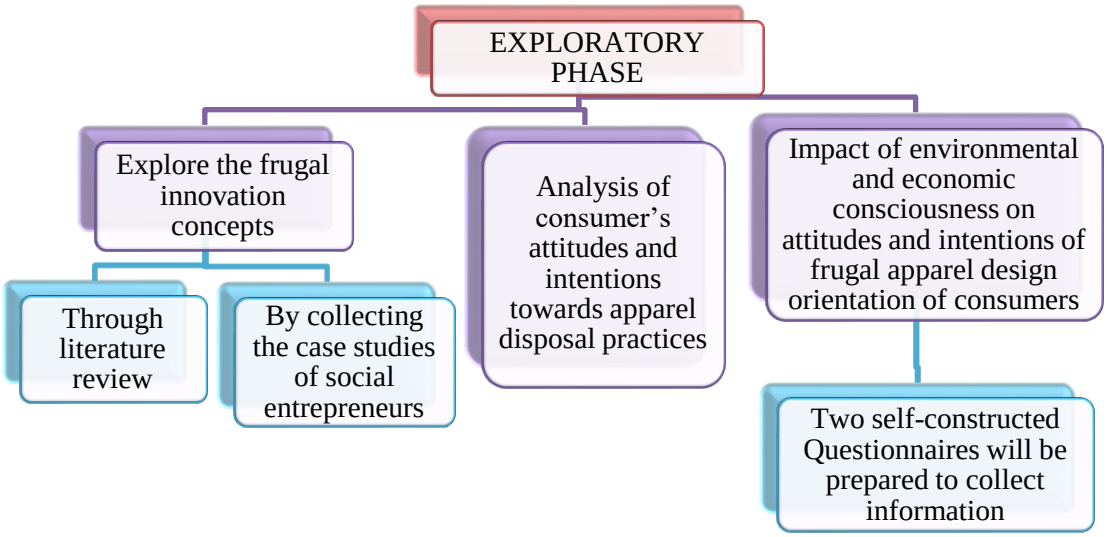
EXPLORATORY PHASE
Explore the frugal innovation concepts
Through literature review
By collecting the case studies of social entrepreneurs
Analysis of consumer's attitudes and intentions towards apparel disposal practices
Impact of environmental and economic consciousness on attitudes and intentions of frugal apparel design orientation of consumers
Two self-constructed Questionnaires will be prepared to collect information

Fig - 3.1 Exploratory phase of the research

3.1.2 Analysis of consumer's attitudes and intentions towards apparel disposal practices

A questionnaire will be designed to study the clothing practices of the consumers related to recycling and reuse. It will also focus on the factors influencing sustainability in clothing consumption of respondents.

3.1.3 Impact of environmental and economic consciousness on attitudes and intentions of frugal apparel design orientation of consumers

Two self-constructed Questionnaires will be prepared to collect information. The standardized scales/tools will be adapted as per the objectives of the study as shown Table no. 3.1

S.NO	CONSTRUCT	REFERENCE TOOLS
1	**Frugal apparel design orientation**	LeepHunderfund et al1(2016), Frugality Scale (Lastovicka, Bettenoourt, Hughner, &Kuntze, 1999), CSC Scale by Balderjahn et al. (2013)
2	**Environment consciousness**	Dillman's (2007), Dunlap et al. (2002); Mostafa (2007)
3	**Economic consciousness**	Lastovicka, Bettencourt, Hughner, and Kuntze (1999)
4	**Attitude & Adoption intention**	Taylor and Todd (1995); Chan (2001); Mostafa (2007)

Table 3.1: Research tools proposed

3.2 EXPERIMENTAL PHASE

This phase is an important part of this research as it focuses on introducing frugal apparel design strategies

3.2.1 Formulating frugal apparel design strategies-

Based on the literature review and adaptation of the four step model (Charter & Chick, 1997), the research proposes the following frugal apparel design strategies.

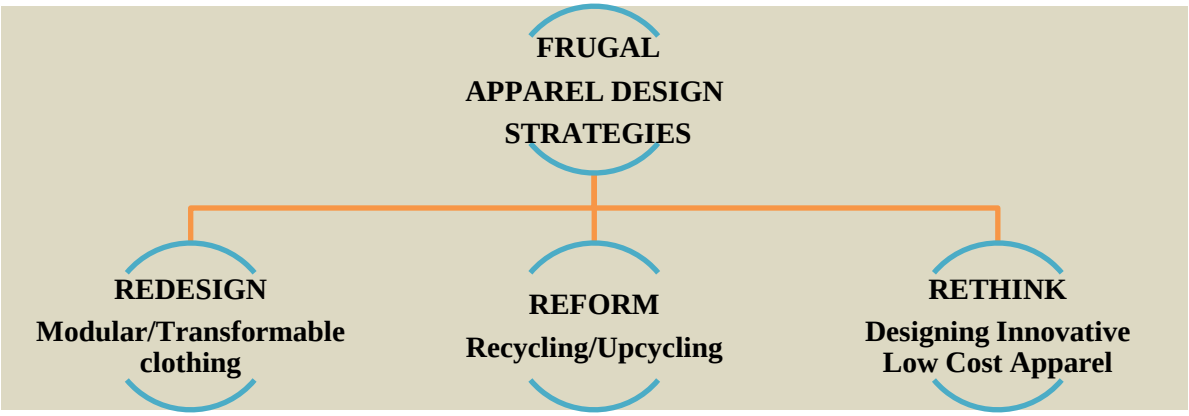

Fig - 3.2 Frugal apparel design strategies

3.2.2 Creating Frugal Apparel Designs- The next part of this phase frugal apparel designs collections would be created to meet the goals for consumer appeal. The researcher will create 10 designs of each category. Total **30** frugal apparel designs will be created for social sustainability.

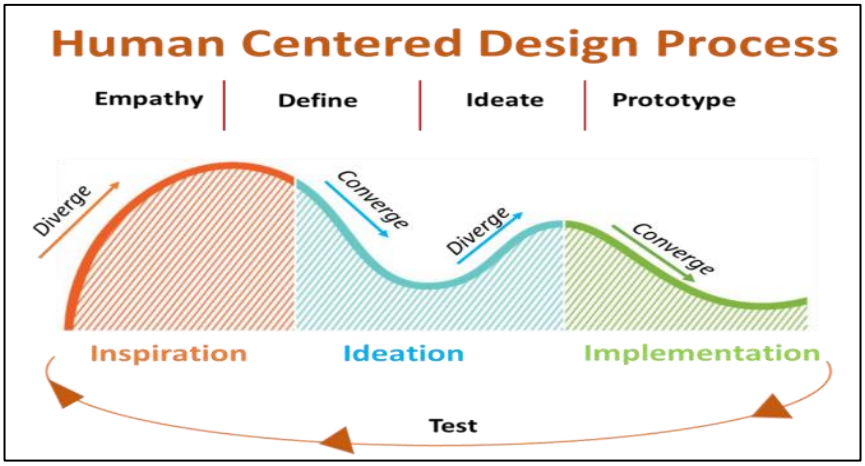

Fig - 3.3 Stages for Human-Centered Design (Source: https://images.app.goo.gl/9nAe9riqfUTW5HTg6)

The Human-Centered Design as shown in Fig- 3.3 will be adopted in creating the frugal designs. This process shows a humanistic approach to creating designs.

3.3 EVALUATION PHASE

3.3.1 Preparation of assessment schedule for evaluation of frugal apparel designs

To assess the acceptability and suitability of created innovative frugal apparel designs, the researcher will develop a five-point rating scale.

3.3.2 Statistical analysis

This data will be tabulated and analysed with the appropriate statistical techniques. Appropriate statistical technique will be applied to analyse data collected.

3.4 PARTICIPATORY AND ACTION PHASE

Following steps will be followed by the researcher in this phase.

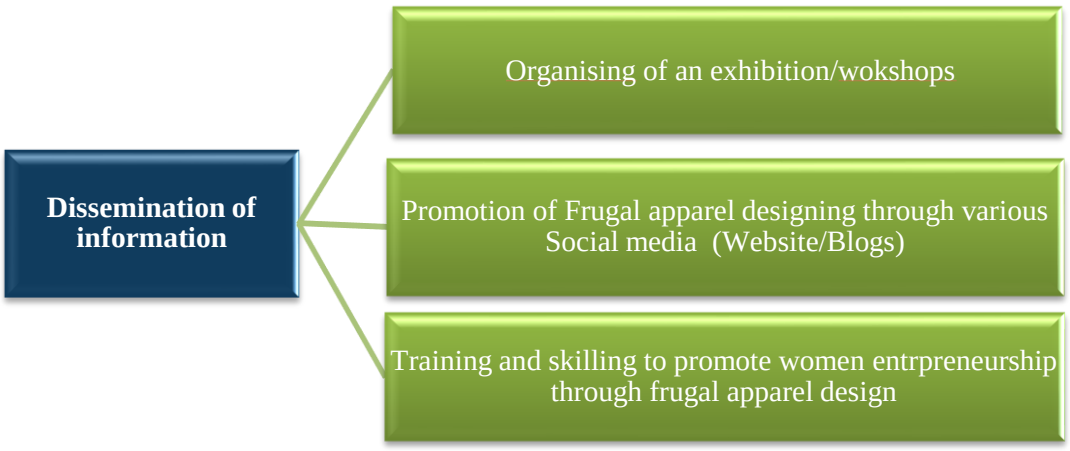
Dissemination of information
Organising of an exhibition/wokshops
Promotion of Frugal apparel designing through various Social media (Website/Blogs)
Training and skilling to promote women entrpreneurship through frugal apparel design

Fig – 3.4 Dissemination of Information

3.4.1 Retailing and marketing strategies

The marketing strategy will be devised to promote those products as trans-seasonal, frugal and sustainable fashion. The target consumer group would be the people who appreciate both sustainable and frugal lifestyle.

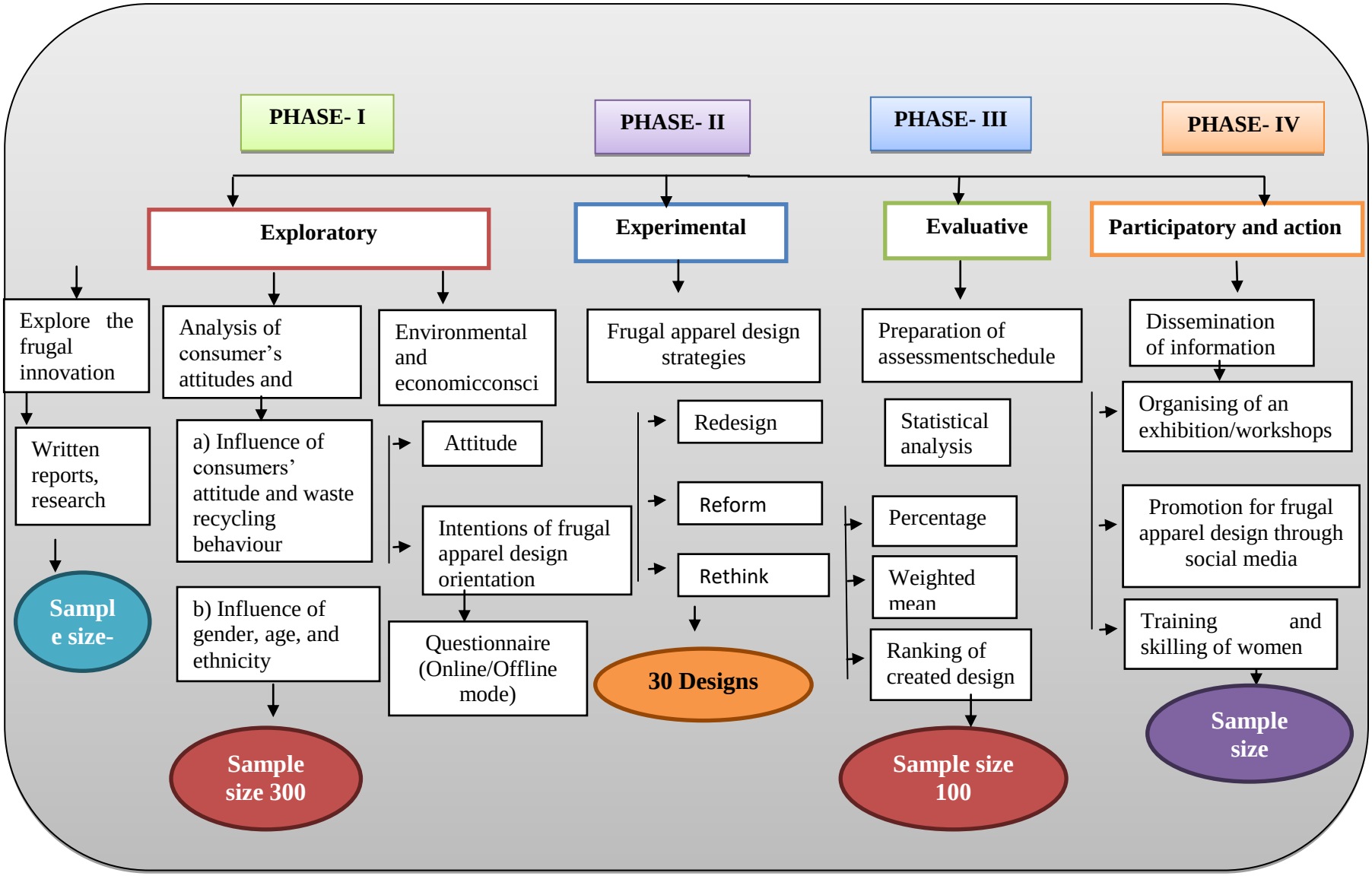

Figure 3.5: A Broad Overview of Mixed method Research Design

4.0 SAMPLING PLAN

- **Locale of the study:** The locale of the study will be Agra and NCR regions in offline mode.
- **Sample size:** The total sample size will be of **400** respondents distributed in four different phases of the research.

❖ **For exploratory phase** –

(a)15 relevant cases

(b) 300 consumers **Age group** (i) 20-30 yrs (ii) 35-45 yrs (iii) 50-60 yrs - 50 males and females (from each age-group)

❖ **For Experimental phase -** 30 Designs will be created.

❖ **For Evaluation phase -** 100 Consumers

❖ **For Participatory and Action phase -** 30 women

4.1 SELECTION OF SAMPLE:

Sample selection will be done in following stages-

❖ **Phase I**In the present study 15 + case studies of social entrepreneurs contributing to sustainable apparel design process in India will be purposively selected. Criteria for selection of social entrepreneurs/case studies would be working for development of sustainable measures in the area of apparel and textiles.

❖ **Phase II Consumers** will be purposively selected for survey on offline and online mode based on the following criteria-

- **Age group:** (i) 20-30 years (ii) 35-45 years (iii) 50-60 years
- **Educational Background:** At least Post graduation
- **Income group:** Upper class and Upper Middle class

➢ **Phase III** Respondent consumers in the age group 20-30 years who had already participated in the survey, will be randomly selected.

➢ **Phase IV** Women from semi-urban area within the local vicinity will be purposively selected based on the following criteria-

- Age group: Above 18 yrs.
- Educational Background: At least 8th class
- Possessing minimum sewing skill level

5.0 STATISTICAL DESIGN:

The information collected through research tools will be analyzed and interpreted with the help of various statistical tools. It will be used according to type and requirement of data obtained. The details are presented in Table no. 5.1

Phases of research	Statistical Design
Phase I **Exploratory Phase**	Content Analysis
Phase II **Descriptive Phase**	Descriptive statistics and Correlation, Regression analysis and additional statistical tests on SPSS
Phase III **Experimental Phase**	-----
Phase IV **Evaluation Phase**	•Percentage •Weighted mean •Other statistical techniques could be incorporated later depending on the type of data collected.
Phase V **Participatory & Action Phase**	-----

Table 5.1: Statistical Design

6.0 DELIMITATIONS OF THE STUDY

- The study will propose only three frugal apparel design strategies.
- Agra and NCR regions will only be selected for survey in offline mode.
- An attempt would be made to create only 30 frugal apparel designed products during the proposed research study.

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